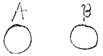
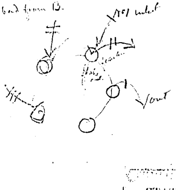
Notebook, N-07-02-00

This undated notebook was probably used during 1910. All entries are by Edison. Most of the book contains notes, drawings, and calculations regarding storage battery experiments. Included are logs of cell endurance tests and what appear to be preliminary plans for the manufacturing process. There are also scattered phonograph drawings. The front cover is labeled "1st Few pages Important data Bismuth." The pages are unnumbered. Approximately 80 pages have been used.



No 1 in A — 0 in B
1 in A — B in B — remove B from B
1 in A B in B —

Good into A nothing in B —
remove bad from A pass to B —
& put good in A —
remove bad from B.



160
20
320

400
5
2000

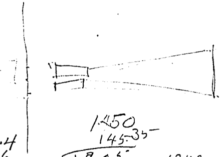
10
100 ft 1/1000
40 lbs
1 ft 1 inch
35 | 1440
140
4
(41 lbs

STATIONER,
Good Work Promptly
58 William Street, N. Y.

#13048

960
11600
500
273
1176
1050
1050
273
810
2700
1200
1225
175
1400

1440
144
1296



1450
145 35
1305

6.4
16
384
64
924

35 | 225 | 6,4
210
150

1340
134
1206

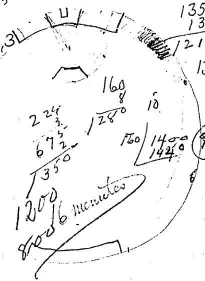
1400

1350
135
1215

1350

35 | 150
20

4.3



4
864

160
8
1280

10

224
3
672
1350

160 | 1400
1440

8½

13400
60
80400

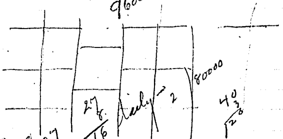
1200
800

6 minutes

467
20
9340

150
5
750
120
750
750
30000

385) 180000 (467
1540
2600
2310
2900
9600- 1C



27
8
216

40
3
120

770000
Now) 546000 (27
400000
146000
500

216
120
936

385
2
770

60

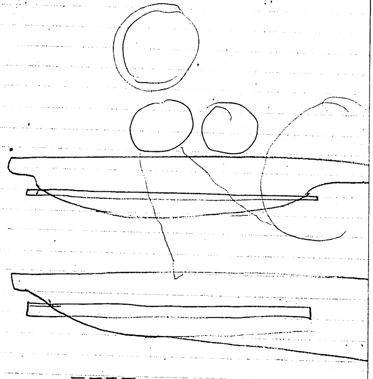
385) 120000 (31
1155
45

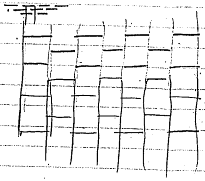
35 60) 120
5

250

75
125
5
625

385) 150000 (4
1540





300 stacks

1200 ft

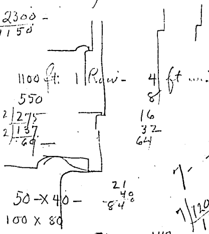
4-

8-

40
40
160

8|2500

2|2300-
1150



1100 ft: 1 Row- 4 ft wide

550
2|275
2|137
69

8
16
32
64

7- 7.87

50 X 40-
100 X 80

21
40
84

7|120
17.14

~~40~~

50
50
21
21

142
142-

21
50
1050

120
32

18700
17140
7480
7790
1800
1900
1300
1870
320518
321

2000
2000
1700
3400
1500
2000
12200

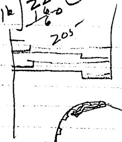
8|12200-
1

8|24400
3130

12|220
180
6

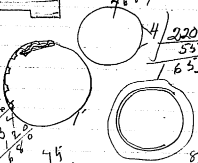
15

205



62500
15625
46875

62500
.3844



4|220
55
65

3844
18
30752
3844
69192

2|125
625
62
124
372
8.3|844
1000
8
20
16
40

125

1800
1666
134
1320
1680
2448
1300
160

44
5

1666
37
5

3844
16
23064
03844
61500

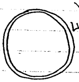
120|200
1200
800
720
80

250
250
12500
500
2462500

125
125
625
250
125
15625

3

49



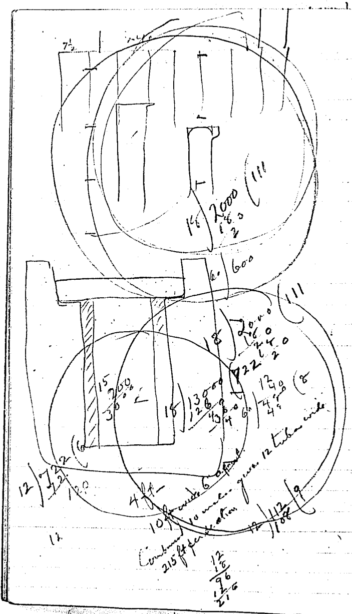
4|1666-
416.5
3
12|1249.5

1

34|1666
136
306
304
33

49
24
196
98
2
117

4.08|1660


2000
18
111
600
18
2000
160
400
122
15
2000
3000
18
1300
1260
40
12
40
111
12
72
120
4 ft
10 ft wide 6 ft apart
10 inches gives 12 tubes wide
Combined
215 ft per section
112
108
12
18
96
12
216

3 lb water Evap for every ~~1~~ ft tube surface to 70 lbs pressure

200 ft per kiln 3000 lbs water must be Evap — which at 1 ~~ft~~ ft per 3 lb = 1000 □ ft of tube surface, as mean Temp in a boiler is 2500 at coal end 450 Stack end mean of 1500 deg — but in Kiln only have 800 or 1/2 therefore the rate of dissipation heat is slower (How much) say 2200 ft will be required, hence with 4 inch tubes — must have 2200 ft of pipe say each 18 ft in heat 122 pipes —

Each section has ~~215 ft~~ 12 pipes in

Say 10 sections this would be 8 ft pitch ~~apart, too close~~ 40 ft —

by making ~~pipes~~ 50 ft for pipes gives 10 inches — ~~by pulling pipes 5 inches apart probably get 12 inches apart per section — 4 be OK —~~

4 ft apart!

8333 lbs min

3)1400
466

24)[illegible] (30,8 ½

38,00 - [illegible]

60)500000 (8333
480

3880 /

932 -

1600
300
1800

3600 ft

7

3880 -

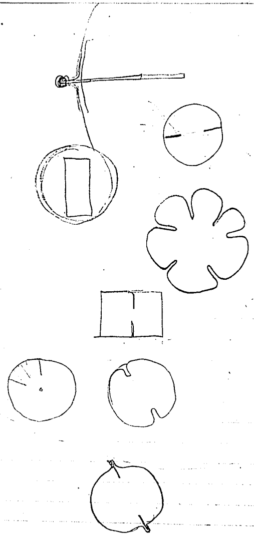
[illegible] (116 -
20
136

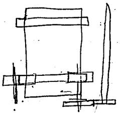
5 Hrs 1 ft per hour

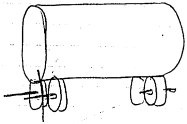
200 -

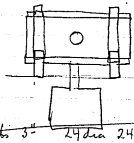
15 1200
15
6000
6000 -
18000

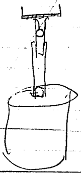
5)18000 -
3600





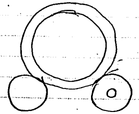






5 lbs 3" 24 dia 24 long

40 lbs –



3ft.-x2-

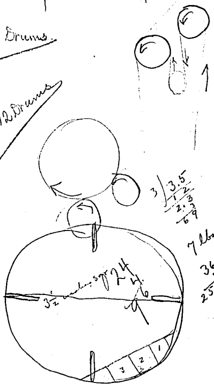
50 lbs - 6 days - 2 days week
2 medium
2 strong

6

200 lbs daily —

24 Drums

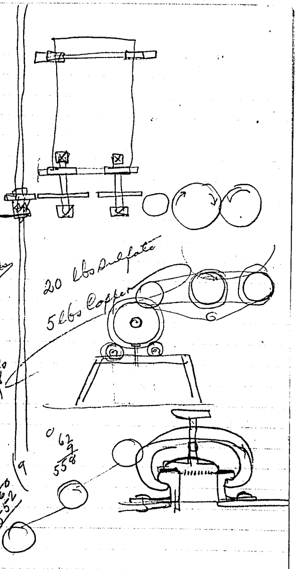
12 Drums



3) 3.5
1 2
2.3
69

2.3
36
138
69
7 lbs inside
7 2.

36
7
252
75 lbs -



400+

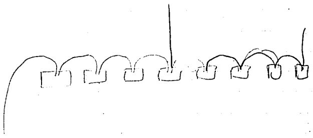
20 lbs

20 lbs Sulfate
5 lbs Copper

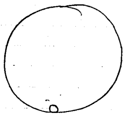
24
24
96
48
576
80
4608

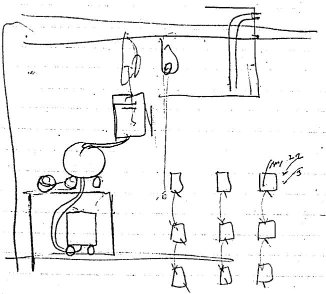
460
36
2760
1380
16560
1728) 15552 (9

0 62
9
558



2250 lbs 75 Each 6 days
18 Drums

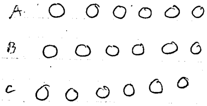




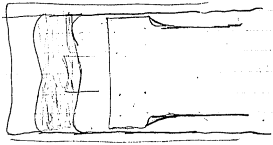
Monday No 3 in a – 7 am.
Wed 7 am run 3 into B + put No 2 in a
Friday 7 am run put No 1 in a - run No 2 in B + 3 in C
Sunday 7 am remove f – A. put in fresh No 3

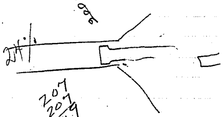
3 in a –
2 in a 3 from a to B.
1 in a 2 from a to B. 3 from B to C.
Remove fl from a, put, put 2 from B into a.

18 Drums –



Load all –
Put weak No 3 in a, 2 days
No 3 in B + No 2 in a 2 days
No 3 in C – No 2 in B + No 1 in a –
Remove flake in A put fresh in +
No 3 Sol. Ru
Run No 1 in B. Remove –
Then 1 in C.



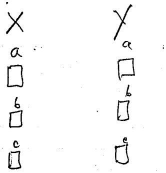


237
237
1659
711
474
56169

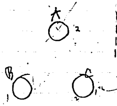
207
207
1449
414
42849

56169
25
280845
112338
1404225

X put in 3
2 days -



a B C - Start No 3 Sol -
then - remove 3 Exhausted -
put in 2 - run thru to 3 & remove to other group of the
as No 3 - put in a - & run thru to another group or 2
Rainbow flake



1 Sol - 2 day A
then in B
1 Sol 2nd 2 day
then to B & B to C
1 Sol to A, then to B - then to C
& C Removed
Then 1 Sol to B, then to C
fresh

① LiOH group poor -
①① Plain KOH good for plain

* New Fe
** High for KOH only

		Cold	50	100	150	200	½	Hot	250	½	Hot	300	½	Hot
Rigtubes, 4 ½ thick flake of 708 soaked 10 min Conc $BiCl_3$ NH_4Cl no wash, boil KOH, wash free K- dried before KOH, 4.3 f 24 - BISMUTH no LiOH - 21K	8081	1107	1193	1173	1153	1120	1173	253	1050	1127	253	* 1150	1267	447
	8082	1100	1153	1147	1160	1133	1193	310	1000	1120	310	1127	1253	473
	8083	1090	1190	1167	1127	1100	1157	293	973	1067	293	1127	1160	323
Dup 8081 BISMUTH. 21K 2 LiOH	8084	1230	1470	1437	1343	1240	1580	1137	1240	1483	1053	1253	1470	1137
	8085	1227	1460	1430	1330	1313	1583	1150	1317	1583	1087	1290	1473	1040
	8086	1220	1413	1400	1263	1230	1490	1120	1213	1533	1040	1240	1417	1070
68 E 719 12 hours in Phosphate Soda dried — 12 hours $BaCl_2$ 4.2 23.8 12.8 h flake 21 KOH. 7439	① 8773	1247	1180	1250	1247	1263	1283	287	1207	1237	** 607			
	8774	1240	1187	1243	1237	1250	1273	270	1187	1253	523			
E72. 719 2h 12 hours in $CaCl_2$ dried — 12 hours in K Fluoride 4.1 1503 f - 24 21K 2 LiOH -	①① 8787	1150	1347	1230	1103	1067	1247	743						
	8788	1163	1358	1240	1207	1133	1307	767						
	Hot on 100	580 587 150	713 727	abnormal										

8084 * 5 on S.

	350	½	Hot
8081	1153	1277	500
8082	1247	1367	673
8083	1213	1327	533
8084	1210*	1530	1067
8085	1277	1577	1110
8086	1217	1530	1100

CO-

227 =

132) 3000. (227
2640
360
264
960
924

37
282) 3000 (10,6
28200
180

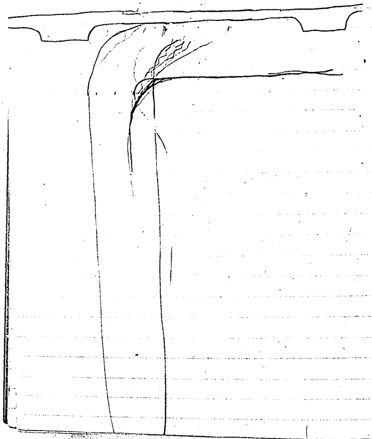
$300

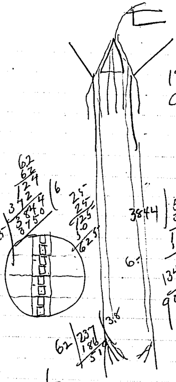
10.6 ~ 24—

2.26 [illegible]

10.6) 240 (2.26
212
280
212
680

226) 3000 (13.2
226
740
678
620





134
904 of
62X62 corned 10 times 3844 in Each
25X25 82 corns & ones 11 times — 625 in Each
51169 in tube

62
62
124
372
3844

625) 3844 (6
3750

25
25
125
50
625

3844) 51169 (13.3
3844
12729
11532
1197

6.

134
6
904

82) 904 (11
82
84

13) 134

62) 237 (3.8
186
51

25) 237 (9
225

25,0

625) 51169 (81.8
5000
1169
625
5340

82

237
237
1659
711
474
56169

		Cold	50	100	½	Hot	150	½	Hot	200	½	Hot	250	½	Hot
719 – No 3 acid flake – 3 grms BISMUTH fastened to each tube 4.3 24.1 21K2 LiOH. 7702	8805	1170	1320	1250	1490	570	1293	1473	580	1157	1490				
	8806	1170	1307	1293	1433	583	1253	1467	553	997	1457				
E77 No 3 f 4.2 f heavy 24.1 21K2 LiOH. RUN COLD 7508	8807	1040	1417	1417	1440		1510	1547	1070	1410	1437	980	1370	1416	890
	8808	1047	1400	1397	1447		1463	1483	777	1407	1430	1123	1353	1390	1073
E77 soak 1½ hours Conc BiCl₃ Aceton BISMUTH															
E78 3 flake acid – 4.3 24.2 21K2 LiOH RUN COLD 7354 ½ strength BiCl₃ Aceton as used in 77	8809	1190	1300	1333	1397		1373	1443	897	1317	1387	1107	1293	1367	917
	8810	1150	1280	1313	1363		1333	1397	843	1310	1363	1010	1260	1317	857
RA 723 filtered in lab with filter. dried low heat – Decantation – No 3 flake acid 4.3 24.1 21K2 LiOH. 6.53 [illegible]	8916	1093	1280	1280	1357	427	1227	1340	543	1213*	1243	723	1180	1317	623
	8917	1120	1287	1287	1370	403	1317	1393	550	1323	1400	703	1300	1450	650
								new f2			S on S z Rings				
RA 723 filtered in lab with filter press low heat Percolation – 4.2 f 21K2 LiOH.	8920	1170	1330	1333	1417	383	1303	1423	550	1337	1427	667	1333	1500	687
	8921	1163	1330	1313	1404	402	1350	1433	570	1333	1430	710	1347	1493	697
									new f2						

7508
85
3754
6004
637
6

15100
2274
2361
2.3

8

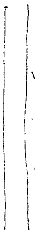
450 ft - 1866 lbs -

64
98
512
576
6272

8 14|96
98

8 inch channel

9 lbs a day



1866 - 210 lbs -

1970
21

215 -

1728|6272
5184
1088
1,03

(3.6

3 day

33

12 lbs

24 lbs foot.

8
192
64
6

8|512
640
320
29

(18.

8|450 -

100 - pounds for 1 foundation per day

562 -

450
16
2700
450
7200
385 -

(18

225
25
1125
450
5625

450 ft. 4|130 lbs
16

8|1728
216

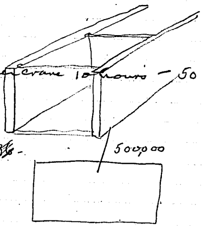
90

100
200
20,000

20 Kilowatts - per crane 10 hours - 50 cells

40
80

5000

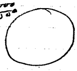


18 ~~36~~ -

500,00

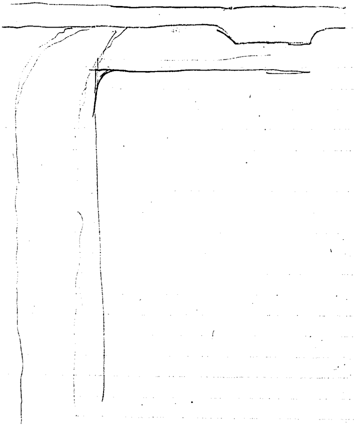
2000 -

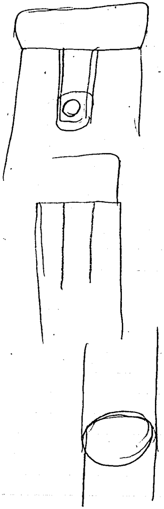
312
2000
624.000

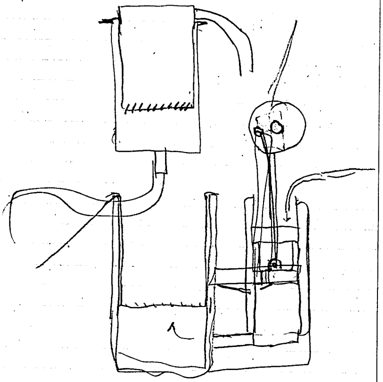


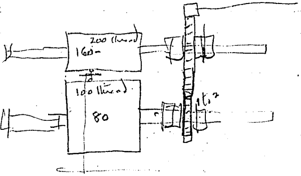
200 V

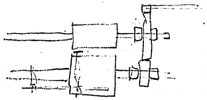
90 V 200 amp

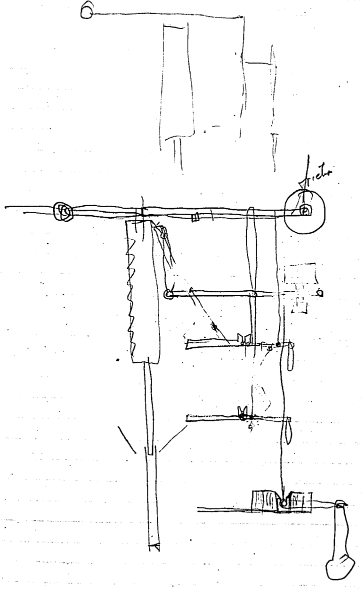


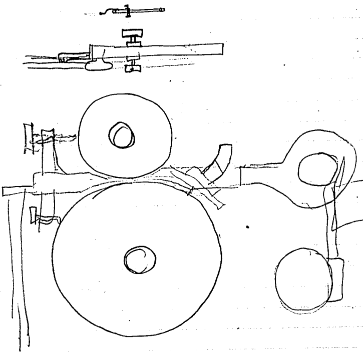


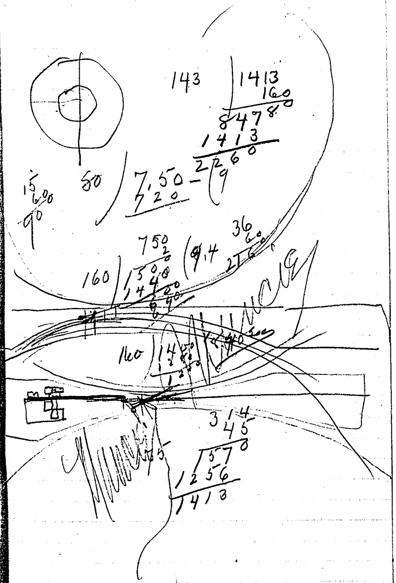



200 thread
160
100 thread
80
1:2

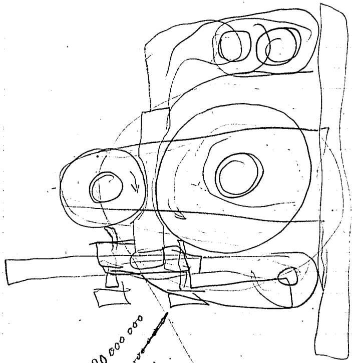



friction




143
1413
160
8478
1413
2260
229
50
1600
90
7.50
720
750
20
160
1500
1440
9.4
36
60
216
160
14
314
45
570
1256
1413

Light
Telephone
Vehicle
Theatre
Through
House



20 000 000
~~40 000 000~~
4000.

~~40¢~~
25
5 600

40-
20-
40 million miles
4 m 4 000
~~$~~ 40 yearly
$160.
60 000
~~Cents~~

1 400 000
4) 1 300 000
325 000

150) 40 000 000
30 000 000
190 000 000

26

260 150 000
1 300 000
2 6 0 000 1
391

32,500,000
.8

2000.

33
225
33
675
675
7433.5

30-
15-
15
5
5
10
4
3
10.3

260
4000
1040

7425-

500
300
51.9 150,000
41.9-

100 000
150 000

3.5.

40.

40 million bbls

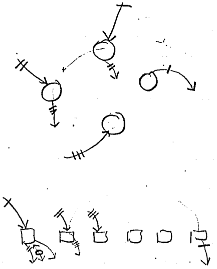
210-

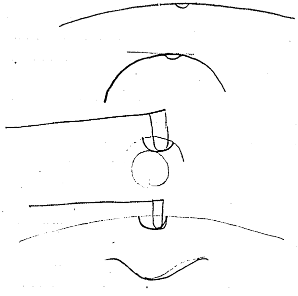
40 000 000
140,000,000

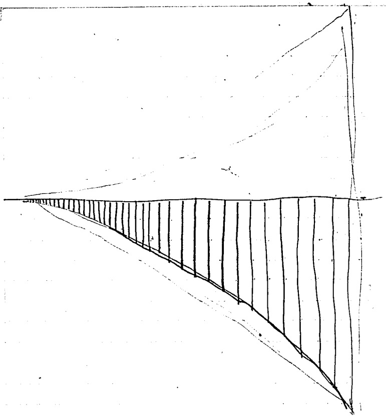
40,000
1 c 66 - 200.
40-

40 000 000
1) 7c.
3.5
2.5
4) 1 400,000
35
4) 35
8.7

3 1/4







C 104	C 52	C 26	C 13	C 6.5	C 3.25
D 92	D 46	D 23	D 11.5	D 5.75	D 2.87
E 82.4	E 41.2	E 20.6	E 10.3	E 5.1	E 2.52
F 78.8	F 39.4	F 19.7	F 9.7	F 4.8	F 2.4
G 68.8	G 34.4	G 17.2	G 8.6	G 4.3	G 2.15
A 61.6	A 30.8	A 15.4	A 7.7	A 3.8	A 1.9
B 54.4	B 27.2	B 13.6	B 6.8	B 3.4	B 1.7

68.8 61.6

39.4

78.8

41.2 34.4 17.2

19.7 15.4

27.2 13.6

30.8 54.4

2) 11.5 / 5.75

2) 10.3 / 5.1

2) 9.7 / 4.8

2) 8.6 / 4.3

2) 7.7 / 3.8

2) 6.8 / 3.4

2) 5.75 / 2.87

2) 4.3 / 2.15

2) 3.8 / 1.9

2) 3.4 / 1.7

C 258 WL 52 - 13" G 387 34.73 — 8.68

D 290 46.34 — 11.586 A 435 30.88 — 7.72

E 325 41.35 — 10.338 B 488 27.54 — 6.88

F 345 38.95 — 9.74

C - 517 .26 — 6.5

4) 52 / 13

488) 1120 (2.295

4) 2.29.5.4 / 6.88

258) 1120 (4.341

4) 41.33.2 / 10.338

325) 1120 (3.446

290) 1120 (3.862

4) 46.34.4 / 11.586

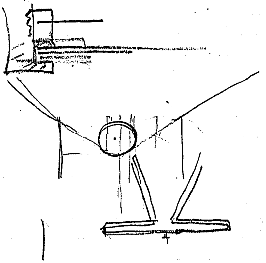
345) 1120 (3.246

4) 38.95.2 / 9.74

387) 1120 (2.894

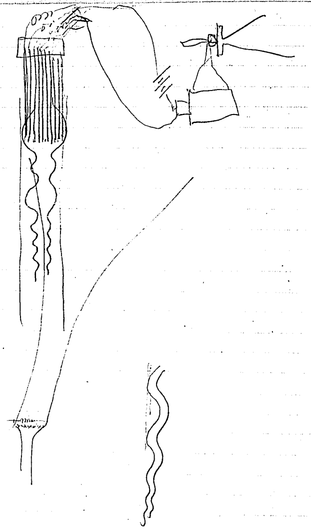
4) 34.17.3 / 8.684

49 - Resonators for Piano
7 octaves -



40
10
2.5
.6

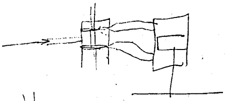
10
5
2.5
1.25

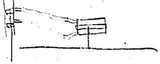


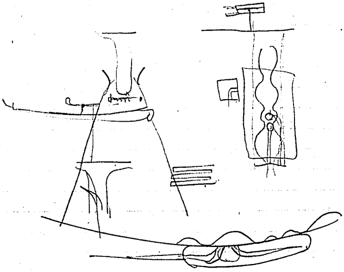
4)52
13 weeks —

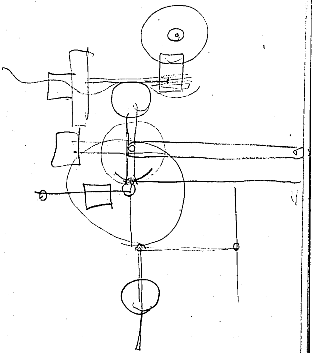
256 | 1120 | 4.38
1024 | 12
968 | 874
76 | 437
194 | 5,247

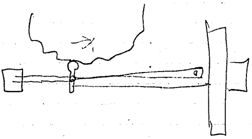
1120
12
0











20 ton car 50 lbs pull ton
40 miles hour

1000 lb draw bar pull —
10 mile trip —

2000 | 52400000 (26 26 HP
40000000
12400000

746
26
4476
1492
19396

20 Kilowatt hours

10 miles in 15 min —
Current given off at rate
of 80 Kilowatts per hour — 40 in hour
10 mins wait each end or round trip
1 hour — 10 hours daily 200 Kilowatt
hours to be stored —
A.8.= 440 cells — 500 watts Each
220000 — Kilowatts —

$22 per cell $9680 —
440
880
880
9680

New Central Newark to NY
1 Car 1 hour
2 30"
4 15
5 12
6 10 minutes —

---

discharge rate,

80 Kilowatts —

1 tube — 500
120

120 / 7500 (650
720
300

60. amp
500
30,000

65
650
120
13000
6500
78000

3 100

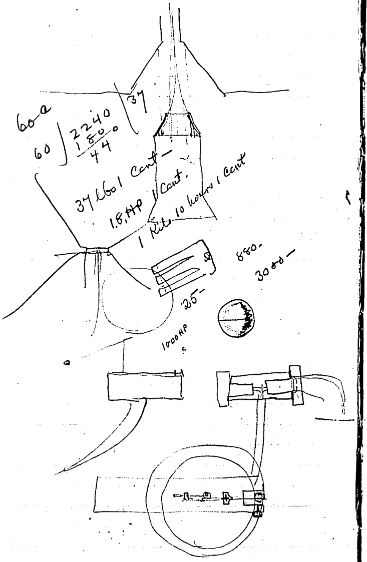
150
5
750

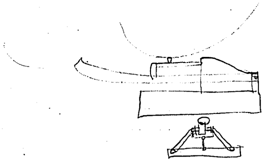
440
120
8800
440
52800

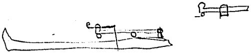
60 1200
7200

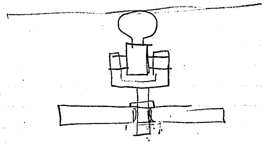
2.

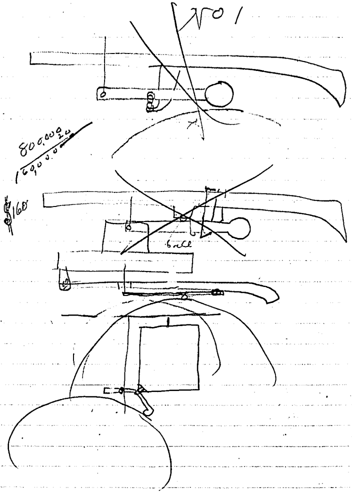
3 Hours


60 a
60) 2240 (37
180
44
37 lb 1 Cent –
1.8 HP 1 Cent.
1 Kite 10 hours 1 Cent
880 –
3000 –
25 –
1000 HP



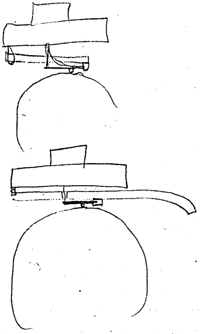


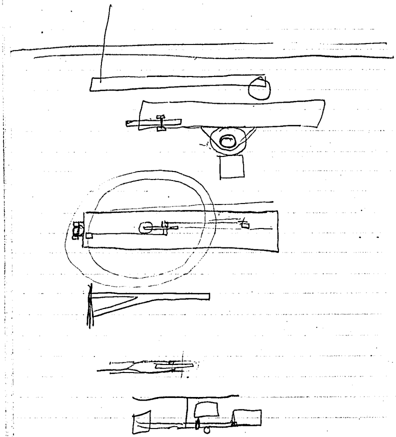




800,000
24
1600,000

$160





2·7- Cost
600
27

160 - 150
80 4
60 6

12800 -
4
51200

48000 m
15200
31800

360

5.5
30
2.5

446

1000 (gms hour
892 (212
1080
1

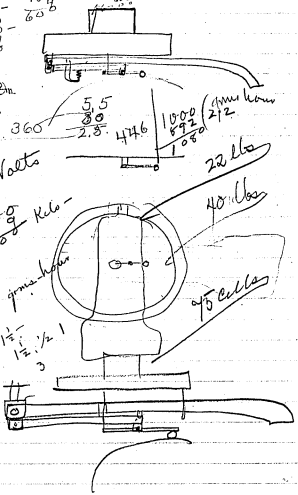
9 Volts

30

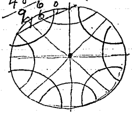
200
9 Kilo -
1800

200 gms-hour

1½
1½ ½ 1
3


22 lbs
40 lbs
75 cells

120) 777600 (6480
720
576
480
96



1728
450
8640
6912
777600 450 ft

750
65
3750
4500
48750
8

4875
2500
7375
1

$875

45
8
30
5
40
3
120

84
8
672

8 box 14

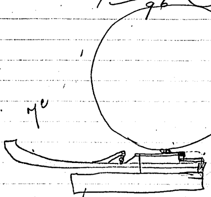
30
30
18
18
96
7
3) 672
224
-448-

9 thick

672-
448-

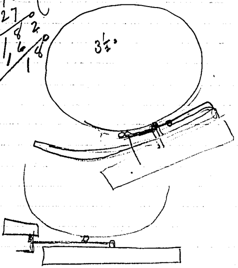
14·
96
12
192
8496 2 (84
14) 112
3

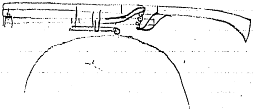
672-) 4800 (71
4704
96

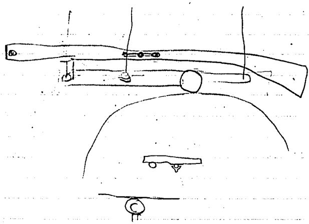


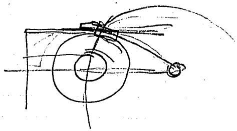
27) 450 (16,6
27
180
162
18

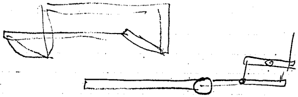
16.6 C

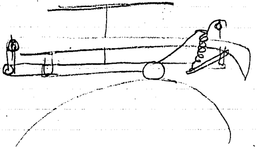


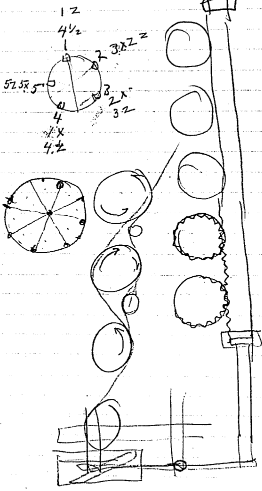


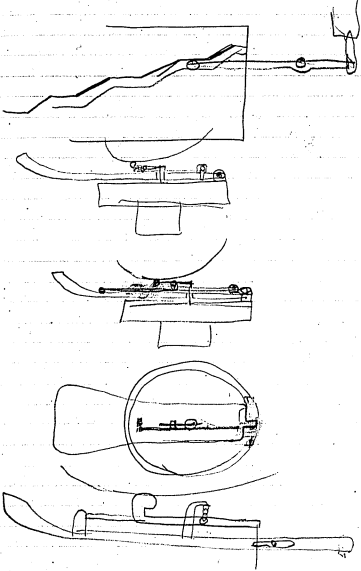









1 2
4½
1
2
3x2 2
52 5x 5
3
2 x
3 2
4
½ x
4.2



Put in Cups.–	4.0
" stuff.	2.0
Put on & press –	0.5
Take out & groove	2.0

0 10–

60–

12.

5 Cells daily –
6 "

6)175
29

30c =

2 48
12
96

48 6 (
57
442) 288
864

50
20

190
30
570

190
57
247

Labor ~~30~~	50
Can	50
	99
	199

100 - miles
3

31200 -
15600
46800

4000 -
2000
46800 | 600000 | (1~~2.8~~
46800
132000
93600
38400
56 -

30 000 -
5
150000
45 -

9000

12.8

60 a

15

340
900
30.6.000
402 000
330 000
7 21 30 -

150. 6000 | 300 000 ~~400~~

300

100
100

250.
250 | 187.500 600.

80. 80 | 150
800
7600
6560
5600
4

125
3
375
100

| 600000

2c

30000 - 1
60 000 2
150 000 3
200 000 - 4 } end of 4th year
+200 000 yearly thereafter

~~4~~ 4 yr life -

Renewal profits - 5th year 60 000
6 120 000
7 ~~180 000~~
8 - ~~240 000~~

15000
80
1200000
42

12000
340
48000
36000
4080000

125
42
83

7 | 55
8 —

120 | 1335 — (11,1
120
135
120
15

8 | 250 -
31 -
3
93 -
2

11 cc
21
11
22
2,31

2.3 cc

93 grms d1OOt to do all the work —

10000 -
30
35000
3
1335
21
133
2670
2803

48 —

111,

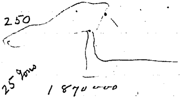
250
14
1000
2500
3500

280 grms

350 —

3000 40
12

250



3500
340
14000
10500
1,19000 00

25 grms

1 870 000

55
10000
55000
340
22000
16500
1,87000 00

15.

5.

9
16
25

330.

1,500

340
8000
2,720000

1 170 000

1.800 000

240
90
330

200 -

9

15
15

25 | 10000 - (400
100

5000
400
2000000
12
4000000
2000000
2400000

120 m

240 000 —

5000
600
3000000

15
8000
150 | 1200000
80
1200
2000 | 1200000 (600
12000

3000 | 2400000 (8
2400000

1200 | 3000000 - (2500
2400
600

340 | 2500 (8 yrs

25 yrs

310
23
930
620
7130

3)3693
1231

3)5986
1993

350
23
1050
700
8050

3)5806
1935

3)4396
1465

3)5977
1992

11

3)5583
1861

3)2479
826

3)5933
1978

3)2912
971

3)4776
1592

3)4655
1552

3)4055
1352

3)3145
1048

3)5213
1738

3)4664
1555

3)4851
1617

3)3604
1201

3)413451
1378

2)1596
3)1734
1245

3)4900
1633

3)2254

3)4275
1425

3)4163
1388

3)4158
1386

3)3700
1233

3)4499
149

3)1551
517

3)3896
1299

3)4946
1649

3)5504
1835

3)5354
1785

3)4671
1557

3)1659
553

3)5175
1728

3)3784
1261

3)4373
1457

3)4483
1494

3)4175
1392

900
120
18000
900
108

3)5092
1697

3)3829
1276

3)4955
1652

3)4966
1655

3)3771
1257

3)3742
1247

3)4771
1590

3)4517
1506

3)4372
1457

3)5792
1931

3)5167
1722

3)4167
1389

3)4713
1571

3)4311
1437

3)2505
835

3)3751
1250

3)4980
1660

3)4426
1475

3)3970
1323

3)4659
1553

3)4804
1601

3)2042
681

3)4725
1575

3)4573
1524

3)3713
1238

3)2036
677

3)4925
1642

3)3354
1118

3)4463
1488

3)2463
821

3)2359
786

3)3293
1098

10
4
20)800(20
40
60